

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claim 2 has been canceled.

New claim 14 has been added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1 and 3-14 are now pending in this application. Claims 4-9, 12, and 12 have been withdrawn from consideration.

Priority

Applicant notes that acknowledgement of Applicant's claim for foreign priority was made in the Office Action Summary sheet of the Office Action but that a box was not checked to indicate that a certified copy of the priority documents had been received. Applicant respectfully requests that the Office check all of these boxes, including an indication of receipt of a certified copy of the priority documents, in the next Office Action.

Rejections under 35 U.S.C. § 103

Claims 1, 3, 10, and 11 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 4,416,755 to Ceasar *et al.* (hereafter "Ceasar") in view of U.S. Patent No. 6,197,134 to Kanzaki *et al.* (hereafter "Kanzaki"). This rejection is respectfully traversed.

Ceasar discloses a method and apparatus for coating a substrate with a semiconducting material and discloses an example of a target that includes high purity, undoped polycrystalline silicon. See Ceasar at col. 1, lines 13-16, and col. 8, lines 31-34. The Office states on page 3 of the Office Action that Ceasar does not disclose or suggest

crystal orientation ratios, such as those recited in claim 1. Claims 3, 10, and 11 depend from claim 1.

Kanzaki discloses that face-centered cubic metals suitable for use as target materials can have orientations satisfying the relation $I_{(220)}/I_{(111)} \leq 1.0$, with $I_{(220)}$ representing the intensity of the (220) face and $I_{(111)}$ representing the intensity of the (111) face. See Kanzaki at col. 1, lines 8-10, and col. 2, lines 9-18.

However, as noted on page 4 of the Office Action, Ceasar and Kanzaki are silent in regard to relative density of a target. Therefore, the combination of Ceasar and Kanzaki does not render claims 1, 3, 10, and 11 to be unpatentable because the combination of Ceasar and Kanzaki does not disclose or suggest a sputtering target consisting essentially of, among other things, Si, wherein the target comprises Si sintered material having a relative density in a range of 70% or more and 95% or less, as recited in claim 1.

In addition, the examples of Kanzaki regard copper materials, not silicon. Kanzaki does not disclose or suggest controlling the $(I_{(111)}/I_{(220)})$ intensity ratio for silicon. Applicant notes that the sputtering conditions for a silicon target differs from those for a copper target, particularly since silicon has an atomic weight (28.1) that is significantly different from that of copper (63.5). Therefore, Kanzaki does not disclose or suggest that a silicon target has a ratio $(I_{(111)}/I_{(220)})$ of peak intensity $(I_{(111)})$ of (111) face to peak intensity $(I_{(220)})$ of (220) face of Si is in a range of 1.8 ± 0.3 , as recited in claim 1, and does not remedy the deficiencies of Ceasar.

As discussed in paragraphs 0014-0019 of Applicant's specification, when a silicon oxide film is formed with a conventional Si sputtering target that has a high orientation property with respect to a particular crystal plane, such as the (111) face, dispersion tends to cause an in-plane distribution of a film thickness because sputtered particles have a particular flight angle and a deposited degree of the sputter particles is variable depending on a position with the sputtered silicon oxide film. The sputtering target of claim 1 advantageously controls the peak intensity ratio of $(I_{(111)}/I_{(220)})$ to be in the range of 1.8 ± 0.3 , which indicates a non-orientation state of Si. In addition, a relative density of 70% to 95% advantageously

provides a target with an improved film forming speed, with the relative density not exceeding 95% because higher densities correlate to orientations in particular crystal plans, and the relative density not being less than 70% to provide a target with a sufficient strength.

For at least the reasons discussed above, reconsideration and withdrawal of this rejection is respectfully requested.

Claim 2 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ceasar in view of Kanzaki and further in view of U.S. Patent No. 6,800,182 to Mitsui *et al.* (hereafter “Mitsui”). Claim 2 has been cancelled and the features of claim 2 have been added to claim 1.

In regard to claim 1 and the combination of Ceasar, Kanzaki, and Mitsui, Mitsui does not remedy the deficiencies of Ceasar and Kanzaki. Mitsui discloses a sputtering target that comprises SiC and metallic Si. See Mitsui at col. 1, lines 64-67. Mitsui discloses that the relative density of the target is at least 60% but this includes both SiC and Si. See Mitsui at col. 2, lines 59-61.

Mitsui discloses an example in which SiC powder is sintered to provide a SiC preform that has a relative density of about 81%. See Mitsui at col. 5, lines 49-48. However, this preform is made of SiC and does not consist essentially of Si, as recited in claim 1. Instead, the SiC preform is then impregnated with metallic Si to provide a target with a relative density of about 100%. See Mitsui at col. 5, lines 48-53.

Therefore, Mitsui does not remedy the deficiencies of Ceasar and Kanzaki because Mitsui also does not disclose or suggest a sputtering target consisting essentially of, among other things, Si, wherein the target comprises Si sintered material having a relative density in a range of 70% or more and 95% or less, as recited in claim 1, because Mitsui discloses relative densities for targets made of SiC and Si and for SiC preforms.

Furthermore, one of ordinary skill in the art would understand that a SiC and Si target has different characteristics than a Si target. Mitsui discusses silicon targets and notes that they have relatively low film-forming speeds and are susceptible to cracking. See Mitsui at

col. 1, lines 16-43. Mitsui states that the SiC and Si target of Mitsui provides a high film-forming speed and suppresses cracking. See Mitsui at col. 1, lines 55-61, and col. 2, lines 4-34. As a result, the SiC and Si target of Mitsui is not a target consisting essentially of Si, as recited in claim 1, because a SiC and Si target affects the basic and novel characteristics of a Si target, as disclosed by Mitsui. In addition, one of ordinary skill in the art would not have looked to the teachings of Mitsui when considering a modification to a Si target.

For at least the reasons discussed above, the combination of Ceasar, Kanzaki, and Mitsui does not render claim 1 to be unpatentable. Reconsideration and withdrawal of this rejection is respectfully requested.

New Claim

New claim 14 has been added. Claim 14 depends from claim 1 and is allowable over the prior art for at least the reasons discussed above and for its respective additional recitations.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith,

Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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